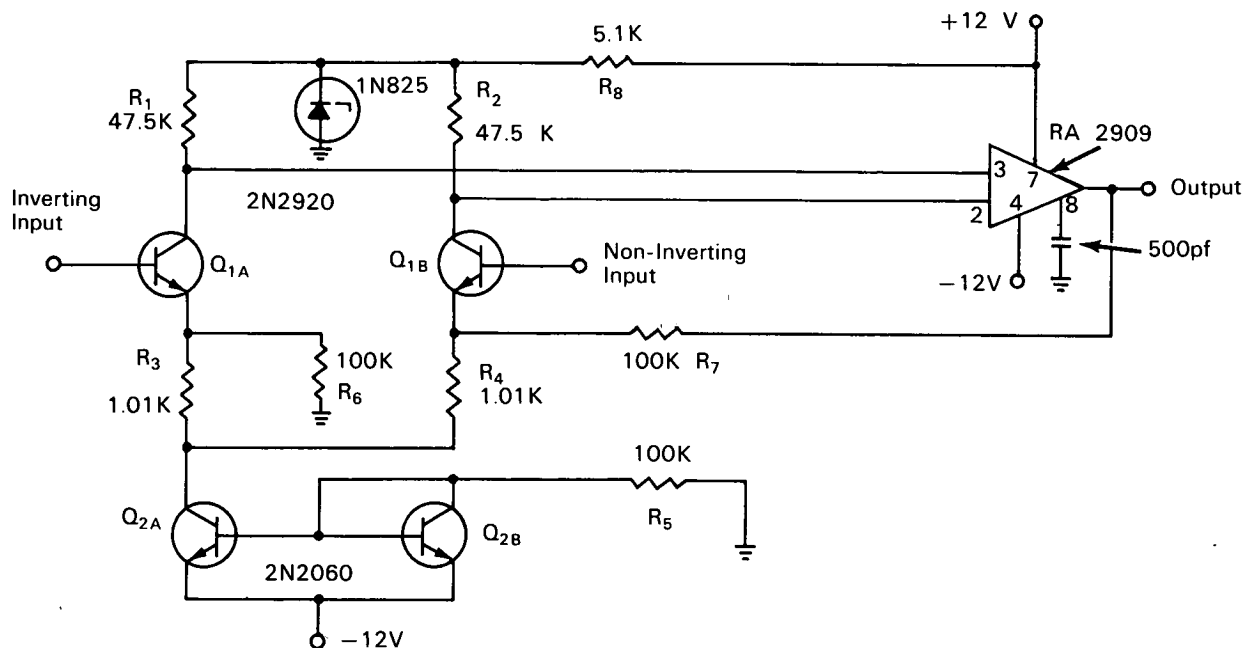


NASA TECH BRIEF



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Amplifier Improvement Circuit



A stable input stage was designed for use with an integrated circuit operational amplifier to provide improved performance as an instrumentation-type amplifier. It is frequently necessary to process differential low level signals having an undesirable common mode component. If the source impedance is high, the amplifier must have a high input impedance. This is difficult if not impossible to obtain without degrading the performance in other respects using only operational amplifiers.

The circuit shown provides all the desired features; namely, high input impedance, stable gain, good common mode rejection, very low drift, and low output impedance. In addition, the capacitor provides bandwidth limiting without affecting the common mode rejection of the overall amplifier. Operation of the

input stage at low collector currents combined with the feasibility of transistor selection makes possible a lower noise figure than any currently available monolithic amplifiers. Note that no dc biasing is provided to the inputs, therefore, an external path to ground must be provided by the source.

The design shown is for an amplifier with a gain of 100. The gain can be easily changed by changing the resistance ratio between R7 and R4 and R6 and R3. Because the first stage adds gain, the closed loop gain is very stable with both time and temperature. One caution must be observed. Because of the additional gain and phase shift introduced by the added stage, this circuit will oscillate or latch up if used with many of the older non-self-compensated operational amplifiers. It works very well with most sec-

(continued overleaf)

ond generation operational amplifiers, although many do not have an appropriate terminal available for bandwidth limiting.

Notes:

1. No additional documentation for this innovation is available.
2. Technical questions concerning this innovation may be directed to:

Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B68-10456

Patent status:

No patent action is contemplated by NASA.

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(LEW-10712)